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(H)Math, 5

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Bungee the Blondie

A flash of neon and curls flies past the onlookers. A collective gasp emanates from the anticipating crowd. Then… wild cheers, as Barbie successfully and safely completes her bungee.

In the Barbie Bungee investigation, we applied our knowledge of linear equations to a real-world scenario. Our objective was to successfully bungee Barbie doll 4.82 meters safely using an intercept form equation that we formulated suing our collected data.

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| Number of Rubber Bands | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | |
| Trials | 60 | 64 | 63 | 87 | 90 | 93 | 121 | 121 | 120 | 159 | 160 | 160 | 180 | 180 | 183 | 216 | 220 | 218 |
| Mean | 62.3cm | | | 90cm | | | 120.7cm | | | 159.7cm | | | 181cm | | | 218cm | | |

The data that we collected in order to formulate our equation was the centimeters Barbie would bungee in relation to the number of rubber bands that were attached to it. For each added rubber band, we conducted three trials. We conducted three trials in order to ensure that our data was accurate. For each trial, one person would bungee Barbie off of the same point while two people watched the tape measure to see how far Barbie bungeed. After we had conducted all three trials, we would average the three lengths and record the mean in our table.

In our equation,, *x* represents the number of rubber bands. In order to find our equation, we first had to find the slope. We picked two points on our graph, (3, 120.7) and (5, 181) and calculated the slope. We got 30.15. I then formulated a y-intercept equation. For my y-intercept equation, I already knew half of the equation, 30.15x, because I had calculate the slope earlier. I started my estimate of *a* in the *a+bx* y-intercept from equation with 32. I started with 32 because our average centimeters jumped for one rubber band was 62.3 and equals62.15 which is very close to 62.3. However, after graphing my equation on my calculator, I saw that it was not the best line of fit. I kept tweaking my y-intercept until I got to 33 which fit well. So my y-intercept equation is . We chose to use this method because it was simple, and it would be easy to find how many rubber bands it would take for a safe bungee.

In order for Barbie to have a safe bungee, we had to use our y-intercept equation to find out how many rubber bands she would need for her bungee. To do this, we first had to convert the 4.82 meter jump into centimeters because centimeters is the unit we used when we collected our data. In order to convert 4.82 meters into centimeters, we multiplied 4.82 by 100 and got 482. Then we plugged 482 into our previous y-intercept equation for a new equation:

449=30.15*x*

14.9=*x*

14

We rounded down to 14 rubber bands because if we rounded up to 15 rubber bands, Barbie would hit her head, and it would not be a successful jump.

On the final jump, we used 14 rubber bands. We went to the top of the stairwell, and dropped Barbie. She came within a few centimeters of hitting the ground, but she did not hit her head. We expected this because for our number of rubber bands for the final jump, we did not get an even 14. We calculate 14.9, but splitting the rubber bands was not an option.

We encountered a few problems while collecting data. One problem was determining whether we wanted to use a y-intercept equation or a point-slope equation. Another issue we encountered was deciding which number should be used as the y-intercept in our y-intercept equation. We also were successful in a few areas. One was making sure our data collecting was accurate. If I could repeat the whole experiment, I would probably have chosen smaller rubber bands in order to make the jump more precise.